

WHAT IS CLAIMED IS:

A core plate assembly [for a nuclear reactor,] the reactor comprising a plurality of large control rods, a plurality of cruciform shaped control rod guide tubes, and a plurality of fuel bundles having lower tie plates, said core plate assembly comprising:

- 5 a flat plate;
- a plurality of support beams, said flat plate positioned on top of said support beams;
- 10 a plurality of control rod guide tube openings, each said guide tube opening sized to receive a control rod guide tube, said control rod guide tube openings arranged in staggered rows;
- a plurality of fuel supports extending through said flat plate, each said fuel support comprising:
- a coolant flow inlet;
- a coolant flow outlet sized to receive (a) lower tie plate of a fuel bundle; and
- a coolant flow bore extending between said coolant flow inlet and said coolant flow outlet, said coolant flow inlet offset from said coolant flow outlet so that a centerline of said coolant flow inlet is parallel to a centerline of said coolant flow outlet.
- 20 A core plate assembly in accordance with Claim 1 wherein said guide tube openings have a cruciform shape and comprise four slots extending radially from a central portion at right angles to each other, said slots defining four fuel bundle receiving areas.
- 25 A core plate assembly in accordance with Claim 1 wherein each said coolant flow inlet comprises an orifice plate.

4. A core plate assembly in accordance with Claim 2 wherein said coolant flow inlets are positioned adjacent a support beam, and said coolant flow outlets are positioned in a fuel bundle receiving area.

5 5. A core plate assembly in accordance with Claim 2 wherein each

said fuel bundle receiving area comprises four fuel supports.

6. A core plate assembly in accordance with Claim 2 wherein each said fuel bundle receiving area comprises one fuel support.

~~X~~ A core plate assembly in accordance with Claim 2 wherein each fuel support further comprises:

10 four coolant flow inlets;

four coolant flow outlets sized to receive a lower tie plate of a fuel bundle; and

four coolant flow bores, each flow bore extending between a corresponding coolant flow inlet and a corresponding coolant flow outlet, said coolant flow inlets offset from said corresponding coolant flow outlets so that a centerline of said coolant flow inlet is parallel to a centerline of said corresponding coolant flow outlet, said coolant flow inlets positioned adjacent a support beam, and said coolant flow outlets positioned in a fuel bundle receiving area.

~~X~~ 20 A core plate assembly in accordance with Claim 7 wherein each said fuel bundle receiving area comprises one fuel support.

~~X~~ o. A core for a nuclear reactor comprising:

a plurality of fuel bundles, each fuel bundle comprising a lower tie plate;

a plurality of cruciform shaped large control rods;

25 a plurality of cruciform shaped control rod guide tubes; and

a core plate assembly comprising:

a flat plate;

a plurality of support beams, said flat plate positioned on top of
said support beams;

5 a plurality of control rod guide tube openings, each said guide
tube opening sized to receive a control rod guide tube, said control rod guide
tube openings arranged in staggered rows; and

10 a plurality of fuel supports extending through said flat plate,
each said fuel support comprising:

a coolant flow inlet;

a coolant flow outlet sized to receive a lower tie plate of
a fuel bundle; and

15 a coolant flow bore extending between said coolant flow
inlet and said coolant flow outlet, said coolant flow inlet offset from
said coolant flow outlet so that a centerline of said coolant flow inlet is
parallel to a centerline of said coolant flow outlet.

20 ✓ 10. A core in accordance with Claim 9 wherein said guide tube
openings have a cruciform shape and comprise four slots extending radially from a
central portion at right angles to each other, said slots defining four fuel bundle
receiving areas.

✓ 11. A core in accordance with Claim 9 wherein each said coolant
flow inlet comprises an orifice plate.

25 ✓ 12. A core in accordance with Claim 10 wherein said coolant flow
inlets are positioned adjacent a support beam, and said coolant flow outlets are
positioned in a fuel bundle receiving area.

(13) A core in accordance with Claim 10 wherein each said fuel bundle receiving area comprises four fuel supports.

14. A core in accordance with Claim 10 wherein each said fuel bundle receiving area comprises one fuel support.

5 (15) A core in accordance with Claim 10 wherein each fuel support further comprises:

four coolant flow inlets;

four coolant flow outlets sized to receive a lower tie plate of a fuel bundle; and

10 four coolant flow bores, each flow bore extending between a corresponding coolant flow inlet and a corresponding coolant flow outlet, said coolant flow inlets offset from said corresponding coolant flow outlets so that a centerline of said coolant flow inlet is parallel to a centerline of said corresponding coolant flow outlet, said coolant flow inlets positioned adjacent a support beam, and said coolant flow outlets positioned in a fuel bundle receiving area.

15 16. A core in accordance with Claim 15 wherein each said fuel bundle receiving area comprises one fuel support.